<u>WE CLAIM</u>:

1. A method for processing audio signals comprising:

quantizing the audio signals in spectral lines into quantized data in a plurality of sub-bands in an order of most significant bits to least significant bits;

determining a plurality of scale factors corresponding to each of the sub-bands according to respective noise tolerance of each of the sub-bands;

bit shifting the quantized data in the sub-bands by the respective scale factors if they exceed a threshold value;

coding the quantized data; and

truncating the quantized data.

2. The method of claim 1 further comprising:

de-shifting the coded data;

de-quantizing the coded data; and

decoding the coded data.

3. The method of claim 2 further comprising:

amplifying the quantized data with the respective scale factors; and

de-amplifying the decoded data with the respective scale factors.

4. The method of claim 2 further comprising determining a difference of the quantized data and the de-quantized data.

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5. The method of claim 1 further comprising coding the quantized data in a base layer and an enhancement layer.

6. The method of claim 5 further comprising truncating the quantized data in the enhancement layer up to respective layer size limits.

7. The method of claim 1 further comprising one of Huffman coding, run length (RL) coding or arithmetically coding the quantized data.

8. The method of claim 1 further comprising determining the scale factors by psychoacoustics.

9. The method of claim 1 further comprising converting the audio signals from a time domain to a frequency domain.

10. The method of claim 2 further comprising converting the decoded data from a frequency domain to a time domain.

11. A scale factor based bit shifting (SFBBS) system having an encoder and decoder processing audio signals comprising:

an encoder including

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a quantizer quantizing the audio signals in spectral lines into quantized data in a plurality of sub-bands in an order of most significant bits to least significant bits;

a psychoacoustic model determining a plurality of scale factors corresponding to each of the sub-bands according to respective noise tolerance of each of the sub-bands;

a coder coding the quantized data;

a de-quantizer de-quantizing the quantized data;

a subtractor taking a difference of the quantized data and the de-quantized data;

a bit shifter shifting the difference in the sub-bands by the respective scale factors if they exceed a threshold value; and

a bit slicer coding and truncating the difference.

12. The system of claim 11 further comprising:

a decoder having

a scale factor decoder decoding the scale factors;

a spectrum decoder decoding the quantized data;

a de-shifter de-shifting the coded data; and

a decoder decoding the coded data.

13. The system of claim 11, the encoder further comprising a filter converting the quantized data from a time domain to a frequency domain.

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14. The system of claim 12, the decoder further comprising a filter converting the decoded data from a frequency domain to a time domain.

15. The system of claim 12, the decoder further comprising an adder adding the decoded data.

16. The system of claim 12 wherein the quantized data are amplified and, the decoded data de-amplified, with the respective scale factors.

17. The system of claim 11 further comprising one of a run length (RL) encoder, Huffman encoder or bit slice arithmetic encoder coding the quantized data.

18. The system of claim 11 being implemented in an additive fine granularity scalability (FGS) structure.

19. The system of claim 11 wherein the least significant bits are discarded after the bit shifting.

20. The system of claim 11 wherein the quantized difference is coded in a base layer and an enhancement layer, and the quantized difference in the enhancement layer is truncated up to respective layer size limits.

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21. A method for processing audio signals comprising:

quantizing the audio signals in spectral lines into quantized data in a plurality of sub-bands in an order of most significant bits to least significant bits;

determining a plurality of scale factors corresponding to each of the sub-bands according to respective noise tolerance of each of the sub-bands;

bit shifting the quantized data in the sub-bands by the respective scale factors if they exceed a threshold value;

coding the quantized data in the base layer; and

truncating the quantized data.

22. The method of claim 21 further comprising:

de-shifting the coded data;

de-quantizing the coded data; and

decoding the coded data.

23. The method of claim 21 further comprising discarding the least significant bits after the bit shifting.

24. The method of claim 21 further comprising:

coding the quantized data in a base layer and an enhancement layer; and

truncating the quantized data in the enhancement layer up to respective layer size limits.

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25. The method of claim 21 further comprising one of Huffman coding, arithmetically coding or run length (RL) coding the quantized data.

26. The method of claim 21 further comprising determining the scale factors by psychoacoustics.

27. The method of claim 21, the method being implemented in an additive fine granularity scalability (FGS) structure.

28. A scale factor based bit shifting (SFBBS) system having an encoder and decoder coding audio signals comprising:

an encoder further comprising

a quantizer quantizing the audio signals in spectral lines into quantized data in a plurality of sub-bands in an order of most significant bits to least significant bits;

a psychoacoustic model determining a plurality of scale factors corresponding to each of the sub-bands according to respective noise tolerance of each of the sub-bands;

a bit shifter shifting the quantized data in the sub-bands by the respective scale factors if they exceed a threshold value; and

a bit slicer coding and truncating the quantized data.

29. The system of claim 28 further comprising:

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a decoder further comprising

a scale factor decoder decoding the scale factors;

a spectrum decoder decoding the quantized data;

a de-shifter de-shifting the coded data; and

a decoder decoding the coded data.

30. The system of claim 28 being implemented in MPEG-4 bit slice arithmetic coding (BSAC).

31. A method for processing audio signals comprising:

quantizing the audio signals in spectral lines into quantized data in a plurality of sub-bands in an order of most significant bits to least significant bits;

determining a plurality of scale factors corresponding to each of the sub-bands according to respective noise tolerance of each of the sub-bands;

de-quantizing the quantized data;

bit shifting the difference in the sub-bands by the respective scale factors if they exceed a threshold value; and

coding and truncating the quantized difference.

32. The method of claim 31 further comprising:

de-shifting the coded data; and

decoding the coded data.

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33. The method of claim 32 further comprising:

amplifying the quantized data with the respective scale factors; and

de-amplifying the decoded data with the respective scale factors.

34. The method of claim 31 further comprising one of Huffman coding, run length (RL) coding or arithmetically coding the quantized data.

35. The method of claim 31 wherein the least significant bits, after the bit shifting, are discarded.

36. A scale factor based bit shifting (SFBBS) processor processing audio signals in an order of most significant bits to least significant bits comprising:

a psychoacoustic module determining a plurality of scale factors corresponding to a plurality of spectral sub-bands according to respective noise tolerance of each of the sub-bands;

a bit shifter shifting the processed audio signals in the spectral sub-bands by the respective scale factors if they exceed a threshold value; and

a bit slicer coding and truncating the processed audio signals.

37. The processor of claim 36 further comprising a quantizer quantizing the processed audio signals.

38. The processor of claim 36 further comprising

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a quantizer quantizing the processed audio signals;

a de-quantizer de-quantizing the processed audio signals; and

a subtractor taking a difference between the quantized audio signals and the de-quantized audio signals.

39. The processor of claim 36 being implemented in an additive fine granularity scalability (FGS) structure.

40. The processor of claim 36 being implemented in one of MPEG AAC or MPEG-4 bit slice arithmetic coding (BSAC).

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